

NEW LIGHT IS SHED ON HEREDITY ROLE

Neither It Nor Environment,
but Combination Is Vital,
Chemists Report Here

'FEEDBACK' IS EXPLAINED

Organisms May Be Capable
of Regulating Themselves,
Recent Findings Imply

By ROBERT K. PLUMB

New evidence was presented here yesterday that it is neither environment nor heredity alone but a combination of both that is vital.

This solution to the century-old nature-nurture dispute was offered at a day-long symposium held by the American Chemical Society.

The society is holding its 138th national meeting here this week. Scientific sessions are scattered throughout a dozen midtown hotels. Headquarters for the meeting is the Statler-Hilton Hotel. A special symposium on "Modulation of Gene Expression by Chemical Feedback" was held at the Henry Hudson Hotel.

Chemical feedback is a relatively new concept. It is akin to electronic feedback in that the end products of a series of chemical reactions are able to regulate their own production through "feedback" of a controlling signal.

Single organisms and presumably living animals and man are believed by the proponents of the feedback theory to regulate themselves. Teleology—in which it is necessary to assign "purpose" to the process of life and growth—is not necessary if it can be shown that feedback regulation is sufficient.

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end products control their own production. That is, the presence of an end product in the milieu of a cell causes the machinery that produces the end product to slow down or to stop. This form of cell behavior Dr. Potter characterized as "intelligent." In contrast, a cell that has changed or mutated behaves like an "idiot" in that it continues without feedback regulation to produce even materials that it does not require.

During the symposium, the first documented instance of a feedback mechanism at work in a human instance was presented by Dr. James A. Bain of the Pharmacology Department of Emory University in Atlanta.

Dr. Bain described an infant who was apparently born with a genetic defect in which he could not synthesize a particular chemical. As a result, the infant excreted orotic acid be-

cause uridylic acid was not being produced. When uridylic acid was administered, the infant's bone marrow and blood returned to normal and the orotic acid excretion ceased.

This case, it was reported, documents the fact that chemical feedback is at work in helping man adapt to his environment as certainly as it is at work in a host of studies with lower organisms.

The implications for man of the studies, as summarized by Dr. Potter, are these: an individual may have genetic potential to be a great musician, but unless this potential is developed by the environment it will never emerge.

*more of the same
later on!*

Darwin Softened Views

Over a century ago Darwin was troubled by the implication in his work that life should evolve toward a perfect form. He was in doubt about some of the aspects of life's apparent ability to adapt itself to the environment.

These doubts lead Darwin to weaken his original stand that characteristics are not inherited and that organisms are not born with an ability to adapt.

The chairman of the session, Dr. Van R. Potter of the University of Wisconsin Medical School, opened the symposium by saying:

"I believe that the discovery of chemical feedback in biological systems is the most significant finding since the development of the gene concept. It opens up a new world that Darwin never dreamed of, yet it is a world that would have pleased him immensely."

Feedback Explained

In the current view, the genes, the controllers of heredity, contain specific information in the form of molecules of deoxyribonucleic acid (DNA). The information is written in a four-letter code spelled out by combinations of four bases that make up DNA molecules.

The DNA, probably acting through a chemical closely akin to it, ribonucleic acid (RNA), provides the molecular pattern from which enzyme-forming systems create enzymes or proteins that participate in the machinery of the living and growing cell.

An idea of the scale on which such chemical events take place was presented by Dr. Arthur B. Pardee of the University of California at Berkeley. He estimated that a single bacterial cell contained one to two million protein molecules and that these interacted in a million chemical reactions each minute.

All this chemistry is controlled by feedback in which

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